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EXAMINER

SIANGCHIN, KEVIN

ART UNIT PAPER NUMBER

2623

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/759,150

Applicant(s)

HAMILTON, CHRIS H.

Examiner

Kevin Siangchin

Art Unit

2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on 06 July 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 July 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## Detailed Action

### *Drawings*

#### Response to Drawing Corrections

1. The corrected drawings are objected to under 35 U.S.C. 132 because they introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. Figure 3 introduces new matter.
2. Applicant is required to cancel the new matter in the reply to this Office Action.
3. Corrected drawing sheets are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Specification*

#### Response to Amendments to the Specification

4. The amendments to the Specification, filed July 7, 2004 (henceforth, referred to as *Specification Amendments*), have been acknowledged.

Objections: New Matter

5. The amendment filed July 7, 2004 is objected to under 35 U.S.C. § 132 because it introduces new matter into the disclosure. 35 U.S.C. § 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

- a. All occurrences of the insertion of "JPEG Part 1".
- b. All changes of the variables "B" to "X" and "Q" to "B", etc. creates confusion and is unnecessary.
- c. All changes dealing with subscripts "ij" to "i".
- d. The amendments to pg. 2, lines 18-23: Changes to the variable X from A.
- e. The amendment to pg. 3, "Y" to "-Y".
- f. The amendment to pg. 3, changing "depends on" to "is bounded by".
- g. The amendment to pg. 7, changing the variable from "B" to "-X", inserting "non-overlapping", changing "D" to "Y", Q to "-Q", insertion of "aggregate visual importance", insertion of "pseudo".
- h. The amendment to pg. 8: insertion of "global".
- i. All deletions on pg. 8 of the amendment.
- j. All insertion on pg. 9 of the amendment.
- k. All deletions and insertion on pp. 18-19 of the amendment.
- l. All insertions on pg. 20 of the amendment.
- m. All insertions on page 21 of the amendment.
- n. All corresponding changes to the Abstract.
- o. On page 11, the Applicant changes the subsampling factor from  $\frac{1}{2}$  to 2. This change represents new matter..
- p. On the last paragraph of page 7 of the Specification Amendments, the following is new matter:

... minimizes the quantity  $\|B - Q_{std}\|$ , where  $Q_{std}$  is a chosen standard quantization matrix. The

quantization matrix is then calculated as  $Q = sB$ .

Applicant is required to cancel the new matter in the reply to this Office Action.

### *Claims*

#### Response to Amendments to the Claims

6. The amendments to the Claims, filed July 7, 2004, have been entered and made of record. Claims 1-12 have been amended accordingly.
7. The amendments overcome all objections and U.S.C. § 112(2) rejections put forth in the previous Office Action. However, as shown below, the amendments introduce new matter.

#### Response to Arguments and Remarks

8. The Applicant's arguments, filed July 7, 2004, (referred to, henceforth, as *Applicant's Remarks*) have been fully considered, but are moot in view of the new grounds of rejection.
9. Applicant's main argument is that U.S. Patent 6,314,208 (assigned to Konstantinides et al.) and U.S. Patent Application Publication 2001/0043754 (assigned to Memon et al.) are directed toward JPEG Part 3 (JPEG-3), while the Applicant claims JPEG Part 1 (JPEG-1). U.S. Patent 5,677,689 (assigned to Yovanof), applied earlier, is JPEG-1 compliant, and the Applicant failed to present any arguments thereto.

#### Rejections Under 35 U.S.C. § 112(2): New Matter

10. Claims 1-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention:

- a. *In Claim 1:*

1. All changes to variables and subscripts in Claims 1 are not enabling. A one-

dimensional variable block has no original disclosure. The original disclosure has support only for two-dimensional variables for blocks.

2. The insertion of "JPEG Part 1" to the claims is not enabling in the original specification. There is no support in the original disclosure that the JPEG claimed and disclosed is specifically JPEG Part 1. The citation of JPEG (ISO/IEC JTC SC29 Working Group 1) mentioned in pg. 4 of the specification is only background information about a popular JPEG method and not necessarily a part of the Applicant's invention. See element (f).
3. The insertion of "aggregate" in element (c).
4. The insertion of "local quantization table" and "global quantization table" in elements (e)-(f).

b. *In Claim 2:*

1. All changes to variables and subscripts in Claims 2 are not enabling. A one-dimensional variable block has no original disclosure. The original disclosure has support only for two-dimensional variables for blocks.
2. The functions P, Evq, and Ernd in element (g) are new matter. Comparisons or any other usage of these functions is thus also new matter.

c. *In Claim 3:*

1. All changes to variables and subscripts in Claims 3 are not enabling. A one-dimensional variable block has no original disclosure. The original disclosure has support only for two-dimensional variables for blocks.

d. *In Claim 4:*

1. All changes to variables and subscripts in Claims 4 are not enabling. A one-dimensional variable block has no original disclosure. The original disclosure has support only for two-dimensional variables for blocks.

e. *In Claim 5:*

1. All changes to variables and subscripts in Claims 5 are not enabling. A one-dimensional variable block has no original disclosure. The original disclosure has support only for two-dimensional variables for blocks.

f. *In Claim 6:*

1. All changes to variables and subscripts in Claims 6 are not enabling. A one-dimensional variable block has no original disclosure. The original disclosure has support only for two-dimensional variables for blocks.
2. Constant factor  $s$  is new matter (second to last line of Claim 6).

g. *In Claim 7:*

1. All changes to variables and subscripts in Claims 7 are not enabling. A one-dimensional variable block has no original disclosure. The original disclosure has support only for two-dimensional variables for blocks.
2. The insertion of "JPEG Part 1" to the claims is not enabling in the original specification. There is no support in the original disclosure that the JPEG claimed and disclosed is specifically JPEG Part 1. The citation of JPEG (ISO/IEC JTC SC29 Working Group 1) mentioned in pg. 4 of the specification is only background information about a popular JPEG method and not necessarily a part of the Applicant's invention. See element (f).
3. The functions  $P$ ,  $Evq$ , and  $Ernd$  are new matter. Comparisons or any other usage of these functions is thus also new matter. See element (e.iii.).
4. The insertion of "aggregate" in element (c.ii.).

h. *In Claim 8:*

1. All changes to variables and subscripts in Claims 8 are not enabling. A one-dimensional variable block has no original disclosure. The original disclosure has support only for two-dimensional variables for blocks.
2. The insertion of "JPEG Part 1" to the claims is not enabling in the original

specification. There is no support in the original disclosure that the JPEG claimed and disclosed is specifically JPEG Part 1. The citation of JPEG (ISO/IEC JTC SC29 Working Group 1) mentioned in pg. 4 of the specification is only background information about a popular JPEG method and not necessarily a part of the Applicant's invention. See element (f).

3. The insertion of "aggregate" in element (d).
4. The insertion of "local quantization table" and "global quantization table" in elements (e)-(f).

i. *In Claim 9:*

1. All changes to variables and subscripts in Claims 9 are not enabling. A one-dimensional variable block has no original disclosure. The original disclosure has support only for two-dimensional variables for blocks.
2. The changing of subsampling factor from  $\frac{1}{2}$  to 2 is new matter.

j. *In Claim 10:*

1. All changes to variables and subscripts in Claims 10 are not enabling. A one-dimensional variable block has no original disclosure. The original disclosure has support only for two-dimensional variables for blocks.
2. The insertion of "JPEG Part 1" to the claims is not enabling in the original specification. There is no support in the original disclosure that the JPEG claimed and disclosed is specifically JPEG Part 1. The citation of JPEG (ISO/IEC JTC SC29 Working Group 1) mentioned in pg. 4 of the specification is only background information about a popular JPEG method and not necessarily a part of the Applicant's invention. See element (f).
3. The insertion of "aggregate" in element (c.iii.).
4. The insertion of "local quantization table" and "global quantization table" in elements (e)-(f).



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k. *In Claim 11:*

1. All changes to variables and subscripts in Claims 11 are not enabling. A one-dimensional variable block has no original disclosure. The original disclosure has support only for two-dimensional variables for blocks.
2. The functions P, Evq, and Ernd are new matter. Comparisons or any other usage of these functions is thus also new matter. See element (f).

l. *In Claim 12:*

1. All changes to variables and subscripts in Claims 12 are not enabling. A one-dimensional variable block has no original disclosure. The original disclosure has support only for two-dimensional variables for blocks.

Rejections Under 35 U.S.C. § 103(a)

11. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Note that the previous Office Action (dated: February 03, 2004) is incorporated, herein, by reference, in its entirety.

13. Claims 1, 3, 8-10, and 12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over [Yovanof97] (U.S. Patent 5,677,689, assigned to Yovanof et al.) in view of [Konstantinides01] (U.S. Patent 6,314,208, assigned to Konstantinides et al.).

14. *The following is in regard to Claim 1. [Yovanof97] teaches:*

A method of fully compliant JPEG compression (Yovanof97), Abstract) of an image frame comprising:

- (1.a.) 1. Dividing the image frame into a plurality of non-overlapping, tiled 8x8 blocks.

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2. Forming a discrete cosine transform (DCT) of each block of the image frame to produce a matrix of blocks of DCT coefficients.

- (1.f.) Entropy encoding quantized coefficients and a global quantization matrix to create a image file compliant with baseline JPEG (JPEG Part 1 or, simply, JPEG-1).

Items (1.a.1), (1.a.2), and (1.f.) are typical steps defined in the JPEG standard.

15. [Yovanof97] further comprises:

- (1.b.y.) Calculating an aggregate<sup>1</sup> visual importance ( $A$ ). See [Yovanof97] column 6, line 30.
- (1.c.) Forming a global quantization matrix ( $Q$ -table with entries  $Q_{ij}$  – cf. [Yovanof97] column 4, lines 55-56; the  $Q$ -table will be referred to as  $Q$  hereinafter) by selecting a standard JPEG quantization table (cf. [Yovanof97] column 5, paragraph<sup>2</sup> 1, sentence 2).
- (1.d.y.) Calculating *quadratic* scaling factors ( $Q_{new}$ ) defining bounds over which the image is to be variably quantized (cf. [Yovanof97] column 5, paragraphs 3-4).
- (1.e.) Approximating variable quantization of the DCT coefficients ( $q_{ij}$ ) using a local quantization table ( $Q_{new}Q_{ij}$  being the entries of that table – cf. [Yovanof97] column 7, lines 45 and 50.), while actually producing quantized coefficients  $\left( \left\lfloor \frac{q_{ij}}{Q_{mit}Q_{ij}} \left( \frac{Q_{mit}}{Q_{new}} \right) \right\rfloor \right)$  – cf. [Yovanof97] column 7, line 50) using a global quantization table ( $Q_{mit}Q_{ij}$ ). See [Yovanof97] column 7, paragraphs 1-3.

16. [Yovanof97] does not teach:

- (1.b.) Calculating the visual importance for each block of the image, based upon assigning zeroes for flat features and values approaching unity for sharply varying features
- (1.d.) Calculating *linear* scaling factors defining bounds over which the image is to be variably quantized.

<sup>1</sup> The activity metric  $A$  is an aggregate visual importance in the sense that it aggregates (adds up) the visual importance of each blocks of the image.

<sup>2</sup> When referring to paragraphs in the cited references, the convention followed here is that the paragraph number is assigned to paragraphs of a given column (if applicable) or section, sequentially, beginning with the first full paragraph. Paragraphs that carry over to other columns will be referred to as the last paragraph of the column in which they began.

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17. [Konstantinides01] teaches:

(1.b.) Calculating the aggregate<sup>3</sup> visual importance ( $M_i$ ) for each block ( $i$ ) of the image, based upon assigning zeroes for flat features and values approaching unity for sharply varying features (cf. [Konstantinides01], column 5, last two paragraphs, column 6, lines 27-54 and column 7, lines 45-56)<sup>4</sup>.

(1.d.) Calculating *linear* scaling factors ( $qscale_i$  – [Konstantinides01] column 7, line 60) defining bounds over which the image is to be variably quantized. (The equation in [Konstantinides01] column 7, line 60 is piecewise linear and bounded).

18. [Yovanof97] and [Konsta01] are combinable because they are analogous JPEG compressors.

19. It would have been obvious to one of ordinary skill in the art, at the time of the Applicant's claimed invention, to incorporate a per-block visual importance  $M_i$  of [Konstantinides01], in lieu of the per-image  $A$  visual importance of [Yovanof97].

20. Motivation: Advantageously,  $M_i$  would be more indicative of the local image features than  $A$ .

21. It would have been obvious to one of ordinary skill in the art, at the time of the Applicant's claimed invention, to use linear scaling factors such as  $qscale_i$ , as opposed to quadratic scaling factors  $Q_{new}$ .

22. Motivation: The expressions of both are empirically derived. However, according to [Yovanof97],  $Q_{new}$  is inferior because tends to underestimate its  $Q$ -factor in the range of small  $Q$ -factor values ([Yovanof97], column 5, lines 31-34). The expression for  $qscale_i$  accommodates these. Also,  $Q_{new}$  is quadratic and, therefore, induces additional computational complexity into the scaling factor calculation.

23. *The following is in regard to Claim 10.* Claim 10 recites substantially the same limitations as Claim 1.

Therefore, analogous arguments apply.

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3  $M_i$  is an aggregate or sum.

4 Although [Konstantinides01] do not limit the range of  $M_i$  to the interval  $[0,1]$ , as the applicant does, it can be seen from the formula in column 6 and the pseudocode listed in column 7 of [Konstantinides01] that  $M_i \geq 0$ . [Konstantinides01] suggest a practical range for  $M_i$  derived from empirical data. See [Konstantinides01] column 7, lines 42-44. Furthermore, note that a higher  $M_i$  suggests a higher activity, which, in turn indicates a block of higher visual importance. Similarly, a lower  $M_i$  suggests a lower activity, which, in turn indicates a block of low visual importance. This is consistent with the  $I_j$  of the applicant's claimed method. It would be trivial for one of ordinary skill in the art to map the suggested range of  $M_i$  to the interval  $[0,1]$ . See paragraph 8 of the previous Office Action (after item (b)) for additional details.

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24. *The following is in regard to Claim 3.* As shown in the previous Office Action, the scaling factor  $qscale_i$  can be expressed in accordance with the form shown in Claim 3. Essentially, this form is a linear interpolation of the two user-selected variables (in the form of  $a$  and  $b$ ), with the visual importance  $M_i$  serving as the linear interpolation factor. See paragraph 11 of the previous Office Action, as well as foot-note <sup>†</sup> on page 9.

25. It would have been obvious to one of ordinary skill in the art, at the time of the Applicant's claimed invention, to use this interpolative form.

26. Motivation: Interpolation would advantageously provide values of  $qscale_i$  that vary smoothly with  $M_i$  from the user-defined minimal scaling factor (indicative of the maximum desired quality) to the user-defined maximum scaling factor (indicative of the maximum desired quality).

27. *The following is with regard to claim 12.* The apparatus of applicant's claim 12 is an implementation of the method of claim 3. Therefore, with regard to claim 12, arguments analogous to those presented for claim 3, are applicable.

28. *The following is in regard to Claim 8.* As shown above with regard to Claim 1, the combination of [Yovanof97] and [Konstantinides01] comprises:

(8.b<sub>1</sub>.) Forming a DCT for each block.

(8.c<sub>1</sub>.) 1. Calculating the visual importance for each block.

(8.e.) Approximating variable quantization of the DCT coefficients, using the local quantization table, while actually producing quantized DCT coefficients that have been quantized using a global quantization table

(8.f.) Entropy encoding the quantized coefficients and global quantization table ( $Q_{init}Q$ ), where  $Q_{init}$  is the minimum scaling factor<sup>5</sup>, to create a JPEG-I image file.

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<sup>5</sup> In [Yovanof97],  $Q_{init} = Q_{min}$  ([Yovanof97], column 5, lines 65-67), where  $Q_{min}$  is the lower limit or minimum of the scaling factors  $Q_{new} = Q$  ([Yovanof97], column 5, lines 55-56).

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29. The following is well-known of JPEG: JPEG assumes images are expressed in the YUV color space; JPEG separates each color component of the image into color planes (channels) corresponding to Y, U, and V, respectively; and,

(8.a.) JPEG samples the Y component and the UV components at a 2:1 ratio.

Official Notice is taken.

30. This necessitates that steps (8.b<sub>1</sub>), (8.c<sub>1</sub>), (8.e), and (8.f) be applied to each of the image planes – Y, U, and V. Thus, the combination of [Yovanof97] and [Konstantinides01] would inherently comprise:

(8.b.) Forming a DCT for each block or the each of the color channels Y, U, and V.

(8.c<sub>2</sub>) 1. Calculating the visual importance for each block of the Y, U, and V color planes (channels).

(8.e.) Approximating variable quantization of the DCT coefficients, using the local quantization table, while actually producing quantized DCT coefficients that have been quantized using a global quantization table for the associated color plane (channel) being quantized.

(8.f.) Entropy encoding the quantized coefficients and global quantization table ( $Q_{\text{mit}}Q$ ), where  $Q_{\text{mit}}$  is the minimum scaling factor, to create a JPEG-1 image file.

31. As discussed in the previous Office Action (previous Office Action, paragraphs 12-13), [Konstantinides01] further teaches:

(8.c<sub>K</sub>) 1. Calculating the visual importance for each block of the Y channel (only).  
2. Setting the visual importance ( $M_i$ ) of the U and V channels to the visual importance of the Y channel.

See [Konstantinides01] column 8, lines 41-43.

32. Neither [Konstantinides01] nor [Yovanof97] teach setting the visual importance of the U and V channels to the visual importance of the Y channel block having the maximum visual importance (i.e.  $\max_{v_i}\{M_i \text{ of the Y plane}\}$ ).

33. It would have been obvious to one of ordinary skill in the art, at the time of the Applicant's claimed invention, to extend the teachings of [Konstantinides01] (element (8.c<sub>K</sub>)) by:

- (8.c.)
1. Calculating the visual importance for each block of the Y channel (only).
  2. Setting the visual importance of the U and V channels to the visual importance of the Y channel block having the maximum visual importance (i.e.  
$$\max_{v_i} \{M_i \text{ of the Y plane} \}.$$

34. Motivation: Changes in the chrominance component of color (UV) are substantially less perceptible than changes in the luminance channel (Y). This fact is well-known. Therefore, the compression algorithm can withstand a degradation in the chrominance data without a substantial degradation in the perceptual integrity of the image. Therefore, for the chrominance channels, localized (e.g. per-block) measures of visual importance are unnecessary, and even redundant. Clearly, a single measure would suffice. Depending on the initial resolution of the image, this may result in a substantial reduction in the amount of data required by the algorithm. A natural selection, among the luminance visual importance values, would have been the importance value associated with the most visually important luminance block (i.e. the one with the maximum visual importance). This would ensure the least amount of degradation in the chrominance channels.

35. Neither [Konstantinides01] nor [Yovanof97] teach:

- (8.d.) Forming a global quantization matrix for the Y channel block and one for channels U and V, such that the magnitude of each quantization matrix coefficient is inversely proportional to the importance in the image of the corresponding DCT basis vector.

36. As discussed in the previous Office Action (previous Office Action, paragraphs 12-13), [Konstantinides01] further teaches:

- (8.d<sub>k</sub>.) Forming a global quantization matrix such that the magnitude of each quantization matrix coefficient is inversely proportional to the importance in the image of the corresponding DCT basis vector (cf. [Konstantinides01], column 7, lines 45-51).

As per the discussion above, the application of (8.d<sub>k</sub>.) to each of the constituent Y, U, and V color planes is necessary and inherent. A global quantization matrix satisfying (8.d<sub>k</sub>.) would thus be formed for each of the constituent Y, U, and V color planes.

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37. It would have been obvious to one of ordinary skill in the art, at the time of the Applicant's claimed invention, to carry this further by:

- (8.d.) Forming a global quantization matrix for the Y channel block and one for channels U and V, such that the magnitude of each quantization matrix coefficient is inversely proportional to the importance in the image of the corresponding DCT basis vector (cf. [Konstantinides01], column 7, lines 45-51).

38. Motivation: As stated above, [Konstantinides01] teaches that the U and V color channels share the same visual importance measure. Clearly, if the global quantization matrices for U and V were constructed according to (8.d<sub>k</sub>), then these tables would be the same and, therefore, redundant. Thus, only one matrix is necessary for U and V.

39. *The following is in regard to Claim 9.* It is well-known that JPEG implementations typically that the subsample the chrominance (UV) component at a ratio of 1:2 with respect to the luminance (Y).

40. Claim 4 is rejected under 35 U.S.C. § 103(a) as being unpatentable over [Yovanof97] and [Konstantinides01], in further view of [Memon01] (U.S. Patent Application Publication 2001/0043754A1, assigned to Memon et al.)

41. *The following is in regard to Claim 4.* Note that the new grounds for rejection do not detract from the statements given in the previous Office Action in support of the combination of [Memon01], [Konstantinides01], and [Yovanof97]; nor does it diminish in any way the originally posed motivations to combine. [Memon01] was shown in the previous Office Action to remedy the deficiencies of [Konstantinides01] and [Yovanof97]. Therefore, a prima facie case of obviousness can be established in view of [Memon01] along the same lines of the original rejections. For the sake of brevity, the details will not be repeated here. The Applicant is referred to the previous Office Action (see previous Office Action, pages 10-11).

*Conclusion*

42. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

43. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Siangchin whose telephone number is (703)305-7569. The examiner can normally be reached on 9:00am - 5:30pm, Monday - Friday.

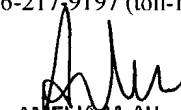
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on (703)308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin Siangchin



Examiner  
Art Unit 2623



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